**Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Plant Cell Osmosis Lab**

**Scenario:** Ryan just bought a new saltwater aquarium and wanted to put some plants in it as decoration for his tropical fish. He went to the local pet store and purchased a bunch of Elodea, which he thought would look good in his aquarium. Like many people, he did not bother to do any research before making his purchase. Not realizing that *Elodea* is a freshwater plant, he proceeded to go home and place the new plant in his saltwater aquarium.

**Instructions:** In this activity, you will be creating an experiment to see the effects of saltwater on a freshwater plant, such as *Elodea*.

To create your experiment, you will be developing and testing a hypothesis. You will follow the guidelines below to complete your experiment and then turn in a typed report including all sections below. The report should follow MLA format and will be turned in tomorrow.

**Experimental Design:**

**Hypothesis:**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Materials used:** (see materials list on board or report guidelines section 6 for list of possible materials)

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**Experimental Steps:** (feel free to add more steps if you run out of room)

**Cell Drawings:** Draw any observed cells or general observations below. Be sure to include titles, labels, and magnification.

**Results Table:** (record any results in the following table. Feel free to add/remove rows or columns if necessary)

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**Report Guidelines:** Your report should include and address all of the following sections.

1. **Title**
2. **Name, Date, and names of groupmates**
3. **Introduction/Background information:**
   * **Summarize** the above scenario
   * **Describe and diagram** what an *Elodea* cell looks under normal freshwater conditions.
   * **Draw** a colored picture of four *Elodea* cells in a cluster.
   * **Label** any parts of these cells that you can identify.
4. **Question/Problem:**
   * What happens to cells when they are placed in solutions/environments that vary from their own?
5. **Hypothesis:**
   * **Hypothesize** what will happen to a cell that is well adapted to life in freshwater when it is placed into a saltwater environment
   * **Draw** your hypothesis of what would happen to the original freshwater *Elodea* cells once you have placed them in salt water.
6. **Experimental Design/Procedure:**
   * Using the available materials, **design an experiment** to test your hypothesis
   * **Materials**:
     + Microscope
     + Slides with cover slips
     + Water
     + Salt solutions (5%, 10%, 25%)
     + *Elodea* leaves
     + Any other materials the teacher has available that you may want to use
   * **List experimental steps** in order and thoroughly **describe** each step in detail (Other people should be able to replicate your experiment by following your listed steps).
7. **Results/Data:**
   * **Draw** what you saw happen to your experimental cell.
   * **Describe** what you saw happen
8. **Conclusions:**
   * **Restate the hypothesis** and question and state whether the hypothesis was **supported by your results** or not.
   * **Explain your results** by restating your data and giving logical explanations for these results. Draw conclusions based on the data you obtained through your experiment.
   * Use your textbook or academic websites to **research a complete explanation** for your observations. Use what you have learned in this unit about cell membranes and types of cell transport in your explanation.
   * **Explain** what happens when a cell that is well adapted to fresh water is placed in a saltwater environment. Use data from your experiment to support your answer.
   * List **three possible errors** in your experimental design or procedure that could have affected the results. Describe what you would change if you did the experiment again.
   * **Describe** any further experiments related to this experiment that you may want to do in the future.

**Plant Cell Osmosis Lab Rubric:**

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|  | **Excellent (4 points)** | **Good (3 points)** | **Adequate (2 points)** | **Needs Work (1 point)** | **Incomplete** |
| **Introduction** | 1. Includes the question to be answered by the lab.  2. States hypothesis that is based on research and/or sound reasoning.  3. Title is relevant | Two of the “excellent” conditions are met. | One of the “excellent” conditions are met. | Introduction is present but no exemplary conditions are met | Not attempted |
| **Methods** | Description or step-by-step progress is included, could be repeated by another scientist | Description is included but some steps are vague or unclear | The description gives generalities, enough for reader to understand how the experiment was conducted. | Would be difficult to repeat, reader must guess at how the data was gathered or the experiment conducted. | Not attempted |
| **Data and Analysis** | Results and data are clearly recorded, organized so it is easy for the reader to see trends. All appropriate labels are included. | Results are clear and labeled, trends are not obvious or there are minor errors in organization. | Results are unclear, missing labels, trends are not obvious, disorganized, there is enough data to show the experiment was conducted | Results are disorganized or poorly recorded, do not make sense, not enough data was taken to justify results | Not attempted |
| **Conclusions** | 1. Summarizes data used to draw conclusions  2. Conclusions follow data (not wild guesses or leaps of logic)  3. Discusses applications or real world connections  4. Hypothesis is rejected or accepted based on data. | 3 of 4 of the “excellent” conditions are met. | 2 of 4 of the “excellent” conditions are met. | 1 of 4 of the “excellent” conditions are met. | Not attempted |
| **Format and Lab Protocols** | Lab report submitted as directed and on time. Directions are followed, stations were cleaned. All safety protocols were followed. | Most of the “excellent” conditions were met with possible minor errors in format or procedures. | Some of the “excellent” conditions met, directions were not explicitly followed, lab stations may have been left unclean or group not practicing good safety. | Student did not follow directions, practiced unsafe procedures, goofed around in the lab, left a mess or equipment lost. |  |
|  | **Total (out of 20 points):** | | | | |